Claims

1. A ceramic thin film coating material having a slope constitution, which comprises

a base material and

a ceramic thin film comprising a composite phase composed of a first phase mainly formed of a silicon ceramic component and a second phase mainly formed of a ceramic component other than the silicon ceramic component of the first phase, in which the amount of fine crystal particles of at least one ceramic component that constitutes the second phase slopingly increases toward a surface layer,

the base material being coated with the ceramic thin film.

2. A ceramic thin film coating material according to claim 1, wherein the amount of the first phase is from 99 to 40 % by weight and the amount of the second phase is 1 to 60 % by weight.

3. A ceramic thin film coating material according to claim 1, wherein the amount of the fine crystal particles of the at least one ceramic component that constitutes the second phase slopingly increases from a depth of from 5 to 500 nm to the surface of the ceramic thin film.

4. A ceramic thin film coating material according to claim 1, wherein the fine crystal particles of the at least one ceramic component that constitutes the second phase have a particle diameter of 50 nm or less.

5. A ceramic thin film coating material according to

claim 1, wherein the ceramic component that constitutes the second phase is at least one member selected from the group consisting of oxides, nitrides and carbides.

6. A ceramic thin film coating material according to claim 1, wherein the ceramic component that constitutes the second phase is at least one member selected from the group consisting of TiO_2, ZrO_2, Al_2O_3, TiN and TiC.

7. A ceramic thin film coating material according to claim 6, wherein the ceramic component that constitutes the second phase is titania and its crystal particle diameter is 15 nm or less.

8. A ceramic thin film coating material according to claim 7, wherein the crystal form of titania is anatase.

9. A ceramic thin film coating material according to claim 1, wherein the silicon ceramic component is at least one member selected from the group consisting of SiO_2, SiC and Si_3N_4.

10. A ceramic thin film coating material according to claim 1, wherein the ceramic thin film has a photocatalyst function and/or a thermal catalyst function.

11. A ceramic thin film coating material according to claim 1, wherein the base material is a glass or a ceramic.

12. A ceramic thin film coating material according to claim 1, which is obtained by

coating a base material surface with a modified organosilicon polymer having a structure obtained by modifying

an organosilicon polymer with an organometallic compound or a mixture of an organosilicon polymer or said modified organosilicon polymer with an organometallic compound,

carrying out a predetermined heat treatment, and

calcining the resultant base material in an oxidizing atmosphere, an inert atmosphere or a nitrogen-containing atmosphere.

13. A process for the production of the ceramic thin film coating material having a slop structure recited in claim 1,

which process comprises

coating a base material surface with a modified organosilicon polymer having a structure obtained by modifying an organosilicon polymer with an organometallic compound or a mixture of an organosilicon polymer or said modified organosilicon polymer with an organometallic compound,

carrying out a predetermined heat treatment, and

calcining the resultant base material in an oxidizing atmosphere, an inert atmosphere or a nitrogen-containing atmosphere.

14. A process according to claim 13, wherein the organometallic compound is a compound having a basic structure of the formula M(OR')n, wherein M is a metal element, R' is an alkyl group having 1 to 20 carbon atoms or a phenyl group and n is an integer of more than 1, or the formula MR"m, wherein M is a metal element, R" is acetylacetonate and m is an integer of more than 1.